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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/561,094

10/25/2006

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EXAMINER

HUANG, DAVID S

ART UNIT

PAPER NUMBER

2611

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/561,094	<b>Applicant(s)</b> WANG ET AL.	
	<b>Examiner</b> DAVID HUANG	<b>Art Unit</b> 2611	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 April 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 5 is/are rejected.
- 7) ☒ Claim(s) 3, 4 and 6-8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Request for Continued Examination*

1. The request filed on 4/15/2010, for a Request for Continued Examination (RCE), is acceptable and a RCE has been established. An action on the RCE follows.

### *Response to Arguments*

2. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claims 1, 2 and 5** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al. (US 6,816,470) in view of applicant's admitted prior art (background of the invention, specification pages 1-5; hereinafter "APA") and Schmidl et al. (US 7,372,825).

Regarding **claim 1**, Kim et al. discloses a method for measuring interference power in a time slot code division multiple access system, comprising:

A. performing channel estimation for received signals with channel estimation codes, to obtain the original channel response estimation results  $h_i$ ,  $i=1 \dots P$ , wherein  $P$  is the total length of the channel estimation window (channel estimation block 12, Fig. 6; col. 3, lines 1-5,  $W$  is the length of the channel impulse response); and

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B. predetermining a threshold of number of taps  $W_I$  and selecting channel response estimation results corresponding to  $W_I$  taps with less power from the original channel response estimation results  $h_i$  according to the threshold of number of taps  $W_I$  as a roughly estimated result of the interference power (noise variance estimate from N smallest samples out of W, where  $h_i$  are in the order of ascending amplitudes, col. 3, line 66 - col. 4, line 7; equation 9).

However, Kim et al. fails to expressly disclose:

(i). C. performing threshold processing on the original channel response estimation results with a signal-to-noise ratio threshold post-processing method by using the roughly estimated result of the interference power and a predetermined signal-to-noise ratio threshold, to obtain an accurate measured result of the interference power; and

(ii). the original channel response estimation results are channel response results of all possible user terminals in the current cell.

With respect to item (i), APA discloses a method of measuring interference power by post-processing against a SNR threshold, performed using specific SNR threshold and a reference threshold interference power according to equations 3-5 (page 4, [10] - page 5, [12]). Estimating interference power according to this method has an advantage in performance, but a reference threshold of interference power must be available. If the priori value is unavailable or the error is high, performing estimation according to this method makes no sense (page 5, [13]).

Nevertheless, Kim et al. discloses the estimation method offers improved accuracy in estimates of the ISCP and noise variance (col. 2, lines 15-18).

Therefore, it would it would been obvious to one of ordinary skill in the art to combine the known prior art interference power measuring techniques as disclose by Kim et al. and APA

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since the deficiency in the APA SNR threshold method would be compensated by the improved accuracy of the Kim et al. method, thus providing the necessary priori value for the SNR threshold method of APA. Furthermore, it would have been obvious to one of ordinary skill in the art to provide Kim et al. with the SNR threshold technique of APA, since the SNR threshold method has an advantage in performance, and would further improve performance and accuracy (APA, page 5, [13]).

With respect to item (ii), Schmidl et al. discloses channel estimation in response to the midambles. The receiver computes the channel estimate for each signal path received at different times within a channel estimation window. The channel estimates are computed using a Fourier transform applied to the entire composite signal that exists in the window (col. 2, lines 36-52; see also col. 2, lines 3-25 for discussion of each cell having its own midamble for all users of the cell using offsets to distinguish between users; thus, the composite signal includes all the possible midamble offsets/users in the cell in the window).

Kim et al. also discloses channel estimation using midambles (Fig. 6, channel estimation block 12, and input midamble).

Because both Kim et al. and Schmidl et al. disclose channel estimation techniques using midambles as inputs, it would have been obvious to one of ordinary skill in the art to substitute one channel estimation technique for the other for the predictable result of generating the channel estimate of the composite signal of a cell for different midamble offsets/paths.

Regarding **claim 2**, Kim et al. discloses everything applied to claim 1, and further discloses said threshold of number of taps  $W_I$  is less than the number of taps of the actual

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interference responses available (N smallest samples out of W; col. 3, lines 4-5, 30-67;  $N_{sample}$ , equations 10-13; col. 4, line 55 - col. 5, line 5).

Regarding **claim 5**, Kim et al. discloses everything applied to claim 1, but fail to expressly disclose the roughly estimated result of the interference power is obtained with the claimed equation, wherein  $\underline{h}'_i$  is the channel response estimation results for  $W_I$  taps, and D is the noise degradation factor of the corresponding channel estimation code.

Nevertheless, Kim et al. discloses a similar equation for interference power estimation (col. 4, lines 55-65, equation 10) in which the summation of square of the first  $N_{sample}$  coefficients of the  $L_{chest}$  channel coefficients  $h_{n(i)}$  output from the channel estimator is multiplied by  $G*\gamma(r)/N_{sample}$  (col. 4, lines 19-23 and col. 5, lines 3-5).

APA discloses a similar equation for interference power estimation in which the summation of a subset of the square of the channel coefficients is multiplied by  $P/(D*W_n)$  (equation 5, page 5, [11]).

Because both Kim et al. and APA disclose equations for calculating interference power, it would have been obvious to one of ordinary skill in the art to substitute the terms outside of the summation for the predictable result of obtaining an equation that calculates an estimate of the interference power.

### *Allowable Subject Matter*

5. **Claims 3,4, and 6-8** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

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**Claims 3-4** disclose the threshold number of taps W1 is in a range of 50 to 90, but the closest prior art, Kim et al., APA and Schmidl et al., fail to specify any values within this range.

**Claims 6-8** disclose equations for calculating a compensated interference power threshold (C1) and for obtaining the accurate measured value of the interference power (C2), but the closest prior art, Kim et al., APA, and Schmidl et al., fail to disclose the equations.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HUANG whose telephone number is (571)270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/David Huang/

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611